REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

Claim 3 has been amended responsive to the rejection under 35 U.S.C. § 112, which is believed to be moot.

Claim 7 has been canceled. Claim 1 has been amended to recite that the Ag sputtering target is made by cold forging including solid forging to extend the length of an Ag mass and cold upsetting the mass in the axial direction while maintaining a columnar shape, followed by slicing the cold-worked mass after heat treatment. Basis for this amendment is found in Figures 4A and 4B, as well as canceled Claim 7. It is respectfully submitted that these method steps must be considered limitations in the product Claim 1 because they provide the unique structural feature being claimed: the Ag sputtering target has three-dimensional fluctuation of grain sizes not more than 18%. MPEP 2113 ("The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims").

Briefly, the claimed invention is based upon the novel recognition that a high uniformity of the surface characteristics of a sputtered Ag thin film requires a sputtering target having a high degree of grain uniformity *in three dimensions*, particularly that a three dimensional fluctuation of the grain size does not exceed 18%. For example, Figure 1 shows that the uniformity of the surface of the sputtered thin film decreases exponentially beginning where the *three dimensional* fluctuation of the crystal grain size exceeds about 18%.

However, producing an Ag sputtering target having a small fluctuation of the crystal grain size *in three dimensions* is not easily done. According to the invention (see, e.g., the non-limiting embodiment of Figures 4A and 4B), this is achieved by forging a Ag columnar mass 1 so as to extend its length in the axial direction to produce the solid forged mass 2.

The forged mass 2 is then cold upset to reduce its length in the axial direction, thereby providing the compressed body 3, which is sliced after heat treatment.

Cold forging of a billet to produce a sputtering target has been known in the art, as has the desirability of small fluctuations in grain sizes in the sputtering target, but not a concern for a small "three dimensional" fluctuation of grain sizes or a recognition of criticality for a small "three dimensional" fluctuation of grain sizes. For example, U.S. patent 6,238,494 (Segal), which was cited in the Office Action to reject Claims 1-4 and 9 under 35 U.S.C. § 102, discloses the formation of a sputtering target by first reducing the thickness of a large billet by upsetting, followed by rolling the billet for further thickness reduction (column 3, lines 25-35; column 4, lines 26-27; column 5, lines 21-23). Segal further teaches annealing to reduce the minimum grain size and dispersion of grain diameters in each local area of the target (column 5, lines 7-15). In particular, forging and rolling followed by annealing can produce dispersion in the average grain size of about ± 3% (column 6, lines 29-40). Moreover, the texture was generally oriented in a direction perpendicular to the target surface (column 6, lines 29-30), and the dispersion of the orientation of the texture could be made less than 4% (column 6, lines 40-41).

It may therefore be appreciated that Segal discloses a concern for reducing variations in the dispersion of the grain diameter, *but not in three dimensions*. The Office Action has evidently relied on the description in Segal of the small dispersion (less than 4%) of the orientation content ratio of the texture as evidence of a small three dimensional fluctuation of the grain sizes, but this is not understood since the small orientation content ratio only refers to the uniformity of *orientation* of the texture, not the three dimensional grain size fluctuation.

In short, Segal provides evidence of the known desirability in the art for reducing the fluctuation of the grain sizes in a forged sputter target. However, Segal lacks any recognition

of criticality for the *three dimensional* fluctuation of the grain sizes in promoting a uniform thin film produced by the sputtering target. Therefore, Segal fails to teach or suggest the claimed feature wherein an Ag sputtering target produced by cold forging and slicing a columnar mass as a "three-dimensional fluctuation of grain sizes not more than 18%."

Concerning the rejection of Claims 5, 6, 10 and 11 under 35 U.S.C. § 103 as being obvious over Segal in view of Japanese patent publication 2003-113433, it is noted that JP '433 was only cited to teach features of these dependent claims, and so it is respectfully submitted that the claims define over any combination of this prior art.

Concerning the double patenting rejection based on Claims 1-4 of co-pending application 10/486,913, it is noted that these copending claims recite variations in the strength ratio for different crystal orientation strengths. This has no relation to the claimed three dimensional fluctuation in grain sizes --not strength ratios. This rejection is therefore respectfully traversed.

Since Claim 1 is believed to be patentable, it is respectfully requested that the withdrawn dependent claims 8 and 12 be included in any patent issuing from the present application.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early Notice of Allowability.

Respectfully submitted,

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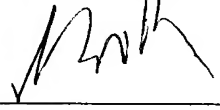

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